

We claim:

1. A process for controlling an audio reproduction system of a telephony device which includes a sound transducer, the process comprising:

5 providing a model of the sound transducer portion of the audio reproduction system;
 providing a control circuit configured according to the model; and
 providing to the control circuit a signal which is
10 indicative of a state of the sound transducer portion.

2. The process according to Claim 1, further comprising providing a model of a signal conditioning portion of the audio reproduction system.

15 3. The process according to Claim 1, wherein providing a signal indicative of a state of the sound transducer portion comprises providing a signal which is indicative of a position of a portion of the sound transducer.

20 4. The process according to Claim 2, further comprising:
 using the control circuit to condition an audio signal as a function of a back electromotive force of a driver of the sound transducer.

25 5. The process according to Claim 2, further comprising:
 using the control circuit to condition an audio signal as a function of an impedance of a driver of the sound transducer.

30 6. The process according to Claim 2, wherein the sound transducer comprises a coil and a diaphragm, the process further comprising:

 using the control circuit to condition an audio signal
35 as a function of a back electromotive force of the coil.

7. The process according to Claim 1, wherein the sound transducer comprises a coil, the process further comprising:
using the control circuit to condition an audio signal
5 as a function of an impedance of the coil.

8. The process according to Claim 1, further comprising:
using the control circuit to condition an audio signal
as a function of a motor factor of a driver of the sound
10 transducer.

9. The process according to Claim 1, further comprising:
using the control circuit to condition an audio signal
as a function of a spring stiffness of a spring support of
15 the sound transducer.

10. The process according to Claim 1, wherein the sound transducer comprises a coil and a diaphragm, the process further comprising:
20 using the control circuit to condition an audio signal
as a function of a motor factor of the coil and diaphragm.

11. The process according to Claim 1, wherein the sound transducer comprises a diaphragm, the process further
25 comprising:
using the control circuit to condition an audio signal
as a function of a spring stiffness of a spring support of
the coil and the diaphragm.

30 12. The process according to Claim 2, wherein the sound transducer comprises a speaker transducer having a coil and diaphragm assembly.

13. The process according to Claim 3, wherein providing to
35 the control circuit a signal indicative of a position of the

sound transducer comprises:

providing to the control circuit a diaphragm position indication signal.

5 14. The process according to Claim 13, wherein providing a diaphragm position indication signal comprises generating the diaphragm position indication signal using an electrical characteristic of the system.

10 15. The process according to Claim 14, wherein the electrical characteristic is an impedance of the coil.

15 16. The process according to Claim 14, wherein the electrical characteristic is a capacitance of the coil with respect to a structure of the speaker transducer.

20 17. The process according to Claim 3, wherein the sound transducer comprises a speaker transducer having a diaphragm and providing a signal indicative of a position of the sound transducer comprises optically generating the signal indicative of a position of the diaphragm.

25 18. The process according to Claim 17, wherein optically generating the signal indicative of a position of the diaphragm comprises using an infrared light source and directing light from said infrared light source to a portion of the diaphragm.

30 19. The process according to Claim 18, wherein using an infrared light source comprises providing an activation signal to an infrared light emitting diode.

 20. The process according to Claim 3, wherein providing to the control circuit a signal indicative of a position of the sound transducer comprises:

35 generating the signal indicative of a position of the

sound transducer using an electrical characteristic of the system.

21. The process according to Claim 20, wherein the sound
5 transducer includes a coil and the electrical characteristic is
an impedance of the coil.

22. The process according to Claim 20, wherein the sound
transducer includes a coil and the electrical characteristic is
10 a capacitance of the coil with respect to a structure of the
sound transducer.

23. A process for controlling an audio reproduction system
of a telephony device which includes a sound transducer, the
15 process comprising:

preparing a model of the sound transducer portion of
the audio reproduction system;

providing a control circuit having first and second
inputs;

20 configuring the control circuit as a function of the
model;

providing an audio signal to the first input;

providing to the second input a signal which is
indicative of a state of the sound transducer; and

25 utilizing the control circuit to generate an output
signal which is a function of the signal indicative of a
state of the sound transducer and the audio signal.

24. The process according to Claim 23, wherein providing
30 to the second input a signal which is indicative of a state of
the sound transducer comprises providing to the second input a
position indication signal which is indicative of a position of
a portion of the sound transducer.

35 25. The process according to Claim 24, wherein providing

to the second input a position indication signal comprises generating the position indication signal using an electrical characteristic of the system.

5 26. The process according to Claim 25, wherein the sound transducer includes a coil and the electrical characteristic is an impedance of the coil.

10 27. The process according to Claim 25, wherein the sound transducer includes a coil and the electrical characteristic is a capacitance of the coil with respect to a structure of the sound transducer.

15 28. The process according to Claim 24, wherein providing to the second input a position indication signal comprises generating the position indication signal optically.

20 29. The process according to Claim 28, wherein generating the position indication signal optically comprises using an infrared light source and directing light from the infrared light source to a portion of the sound transducer.

25 30. The process according to Claim 29, wherein using an infrared light source comprises providing an activation signal to an infrared light emitting diode.

31. The process according to Claim 24, wherein the sound transducer comprises a speaker transducer having a diaphragm.

30 32. The process according to Claim 31, wherein providing to the second input a position indication signal comprises providing to the second input a diaphragm position indication signal.

35 33. The process according to Claim 32, wherein providing a

diaphragm position indication signal comprises generating the diaphragm position indication signal using an electrical characteristic of the system.

5 34. The process according to Claim 33, wherein the electrical characteristic is an impedance of a coil.

 35. The process according to Claim 33, wherein the electrical characteristic is a capacitance of a coil with
10 respect to a structure of the speaker transducer.

 36. The process according to Claim 31, wherein providing to the second input a position indication signal of the sound transducer comprises generating the position indication signal
15 optically as a function of a position of the diaphragm.

 37. The process according to Claim 36, wherein generating the position indication signal optically comprises using an infrared light source and directing light from said infrared
20 light source toward a portion of the diaphragm.

 38. The process according to Claim 37, wherein using an infrared light source comprises providing an activation signal to an infrared light emitting diode.
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 39. The process according to Claim 23, wherein the sound transducer comprises a speaker transducer having a coil and a diaphragm, and wherein preparing a model of the sound transducer portion of the audio reproduction system comprises determining
30 an operational parameter of the speaker transducer as a function of a position of the coil with respect to a portion of the speaker transducer.

 40. The process according to Claim 39, wherein the
35 operational parameter is an impedance of the coil.

41. The process of Claim 39, wherein the operational parameter is a motor factor of a driver of the speaker transducer.

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42. The process of Claim 39, wherein the speaker transducer includes a spring coupled to the diaphragm, and wherein the operational parameter is a stiffness of the spring.

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43. The process according to Claim 23, further comprising preparing a model of a sound transduction portion of the audio reproduction system.

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44. The process according to Claim 23, wherein preparing a model of the sound transducer portion of the audio reproduction systems comprises preparing a model of a speaker transducer.

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45. The process according to Claim 44, wherein the speaker transducer comprises a voice coil transducer.

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46. The process according to Claim 45, wherein utilizing the control circuit to generate an output signal comprises compensation of the system with respect to a spring stiffness of a spring support of the voice coil transducer.

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47. The process according to Claim 45, wherein utilizing the control circuit to generate an output signal comprises compensation of the system with respect to a motor factor of the voice coil transducer.

48. The process according to Claim 23, further comprising preparing a model of a signal conditioning portion of the audio reproduction system.

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49. The process according to Claim 23, wherein utilizing

the control circuit to generate an output signal comprises compensation of the system with respect to a back electromotive force of a driver of the sound transducer.

- 5 50. The process according to Claim 23, wherein utilizing the control circuit to generate an output signal comprises compensation of the system with respect to an impedance of a driver of the sound transducer.